Claims

What is claimed is:

1. A method of molding a sheet molding compound having a reaction agent for increasing the molecular weight, the physical properties or both of the sheet molding compound, comprising:

combining a macrocyclic oligoester and a reactive compound with a transesterification catalyst thereby forming a reactive admixture wherein the reactive compound is selected from another macrocyclic oligoester or a secondary compound;

combining the reactive admixture with a linking agent and a reinforcement material to form the sheet molding compound; and

molding the sheet molding compound at an elevated temperature wherein;

i) the macrocyclic oligoester reacts with the reactive compound in the presence of the transesterification catalyst to produce a block copolymer; and

ii) the linking agent couples chains of the block copolymer together thereby increasing the molecular weight of the block copolymer.

2. A method as in claim 1, wherein the linking agent is a reaction agent selected from a diepoxy resin, a diepoxide, a diisocyanate, a diester or a combination thereof.

3. A method as in claim 1 wherein an end-capped saturated polyester selected from a polycaprolactone terminated by a phenyl isocyanate and a diethylene glycol adipate polyol terminated by phenyl isocyanate are present for assisting in maintaining greater dimensional stability.

4. A method as in claim 1 wherein the linking agent is a reactive monomer selected from a styrene, a methyl methacrylate or a peroxide.

5. A method as in claim 1 further comprising:

combining a filler with the reactive admixture wherein the filler and the reinforcement material represent at least about 50% by weight of the sheet molding compound.

6. A method as in claim 5 wherein the filler is calcium carbonate.

7. A method as in claim 1 wherein the macrocyclic ester, the secondary compound or both are present in the sheet molding compound in an amount between about 1% and about 30% by weight.

8. A method as in claim 1, further comprising:

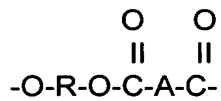
applying the sheet molding compound to one or more plastic films, the plastic films being at least partially formed of a polyester resin wherein, upon molding, the sheet molding compound is integrated with the one or more plastic films in the one or more parts.

9. A method as in claim 1, further comprising:

admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester; wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage.

10. A method as in claim 1 wherein the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture.

11. A method as in claim 1 wherein the macrocyclic oligoester has a structural repeat unit of formula:



wherein R is an alkylene, a cycloalkylene, or a mono- or polyoxyalkylene group, and A is a divalent aromatic or alicyclic group.

12. A method of molding a sheet molding compound into one or more parts, comprising:

combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture;

combining the reactive admixture with a reinforcement material to form the sheet molding compound;

applying the sheet molding compound to one or more plastic films, the plastic films being at least partially formed of a polyester resin; and

molding the sheet molding compound with the one or more plastic films at an elevated temperature to form one or more parts wherein;

i) the macrocyclic oligoester react with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound; and

ii) the sheet molding compound is integrated with the one or more plastic films in the one or more parts.

13. A method as in claim 12, further comprising:

admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester; wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage.

14. A method as in claim 12 wherein the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture.

15. The method of claim 12 wherein the steps of combining the admixture with the reinforcement material and applying the sheet molding compound to the one or more plastic films occur at least partially simultaneously.

16. A method of forming a low-shrinkage molding compound into one or more parts, comprising:

providing a molding compound that includes at least one of a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture; and

admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester; wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage.

17. A method as in claim 16, further comprising:

molding the sheet molding compound to form one or more parts wherein the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after admixing the low profile agent into the molding compound.

18. A method of forming a sheet molding compound into one or more parts, comprising:

combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture;

combining a reinforcement material with the admixture to form the sheet molding compound;

molding the sheet molding compound at an elevated temperature to form one or more parts wherein;

i) the macrocyclic oligoester reacts with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound; and

ii) the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture.

19. A method as in claim 18 wherein the macrocyclic oligoester has a structural repeat unit of formula:

wherein R is an alkylene, a cycloalkylene, or a mono- or polyoxyalkylene group, and A is a divalent aromatic or alicyclic group.

20. A method of molding a sheet molding compound into one or more parts, comprising:

combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture;

combining the reactive admixture with a reinforcement material to form the sheet molding compound wherein the reactive admixture is combined with the reinforcement material according to a technique selected from;

i) applying the reinforcement material to one or more plastic films; coating the one or more films and the reinforcement material with a supplemental reactive admixture in liquid form; and applying the reactive admixture to the one or more films;

ii) applying the reactive admixture to the one or more plastic films; applying the reinforcement material to the admixture; and coating the reactive admixture and the reinforcement material with a supplemental reactive admixture in liquid form; or

iii) a combination thereof; and

molding the sheet molding compound with the one or more plastic films at an elevated temperature to form one or more parts wherein;

i) the macrocyclic oligoester react with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound.